16 Port 10/100Mbit/s Ethernet Switch with Optional Fiber Uplink Port

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Product User Guide

Introduction

This Tyco Electronics auto-negotiating Fast Ethernet workgroup switch with optional fiber uplink enables clusters of up to 16 users to have high speed, low latency LAN connections to the corporate network.

Local management functions such as control of port speed, duplex mode, port trunking and VLAN membership are supported.

The optional fiber uplink module enables the switch to be connected using a fiber link to servers, routers and other devices over distances of up to 2km for multimode or 15km for singlemode.

Package Contents

Unpack the contents and verify them against the items below:-

1. 16 Port Ethernet Switch with fiber uplink option port
2. AC Power cord
3. Four rubber feet
4. Rack mounting kit (2 x brackets and 4 x screws)
5. RS-232 cable

If any item is damaged or missing, please contact your dealer.

Features

- **16 x Auto-sensing 10/100Base-T RJ-45 Ethernet ports**
- **1 x Option slot for 100Mbit/s fiber uplink module that operates over distances of up to 2Km (multi-mode) or 15 Km (single-mode) fiber**
- **1 x Additional 10/100Mbit/s RJ-45 port for uplinking**
- **Meets IEEE 802.3, .3u and .3x Ethernet standards**
- **Local management using an RS232 console port**
- **Management enables detailed control of each port**
- **Support for port-based VLANs and Port Trunking**
- **Uses store-and-forward switching to separate collision domains and abnormal packet filtering**
- **Integral 8K MAC address table automatic learning**
- **Backplane bandwidth up to 3.2Gbit/s**
- **Supports back-pressure & flow control**
- **Numerous diagnostic LED indicators**
- **Internal AC/DC power unit**
- **Stand-alone or mountable in 19” racking**
- **FCC Class A, CE mark certification**

Technical Support and Service

If you require technical advice for these products, please see the FAQ pages on the web address http://www.lan-electronics.com

If you still have problems, please contact us using the support form located on the above web site.

If you have a faulty unit then please contact us through the web site to arrange for a replacement unit. The faulty unit must be returned to us as part of the replacement agreement.

Front Panel

The front panel of the switch has 16 x RJ-45 Shielded/Unshielded Ethernet Ports, an optional fiber Ethernet 100Base-FX uplink port, a console management port and an array of LED indicators.

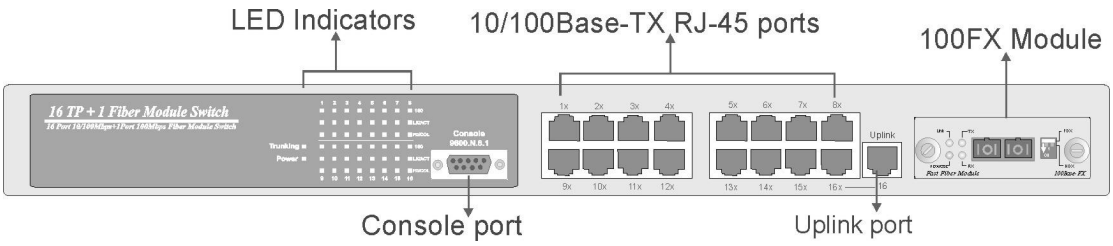

Figure 1 – Switch with optional fiber module (SC Connector) fitted

Ports

- **RJ-45 Ports.** These Ethernet RJ-45 ports support both shielded and unshielded cabling systems. The port auto-negotiates the 10/100Mbit/s network speed or can be forced by the console management interface into either 10Mbit/s or 100Mbit/s at either full-duplex or half-duplex.
- **Uplink RJ-45 Port.** This port is intended for connection to an uplink device without needing a cross-over cable. This is a standard 10/100Mbit/s Ethernet interface and shares the same port assignment as RJ-45 port 16. Therefore, do not use Port 16 when using this RJ-45 uplink.
- **100FX Fiber Port.** This optional, field installable plug-in module provides the fiber link to the distant media converter, NIC card or Ethernet switch. The port operates in either full duplex or half duplex modes depending on the setting of DIP switch on the front panel of the plug-in module. Modules with SC, ST and MT-RJ fiber optic connectors are available. See page 8 for order codes.
- **Console Port.** A PC or other RS232 terminal is connected to this port to enable detailed management of the switch. See the documentation on the web site for full information.

Rear Panel

The rear panel contains the 110/240v AC 50/60Hz power socket. Note that the fusing is external to the switch.

Installation

Copper and Fiber Cabling Guidelines

1. The RJ-45 ports can be connected to unshielded twisted pair (UTP) or shielded twisted pair (STP) cabling systems compliant with the IEEE 802.3u 100Base TX standard for Category 5. The cable between the switch and the link partner device (router, hub, workstation, etc.) must be less than 100 metres long.
2. The fiber link on the optional multi-mode module must use either 50 or 62.5/125 micron multi-mode fiber cable. You can link two devices over a distance of up to 2 kilometres.
3. The fiber link on the optional single-mode module must use 8/125 or 9/125 micron single-mode fiber cable. You can link two devices over a distance of up to 15 kilometres in full duplex mode or 412 metres (1,352 ft.) in half-duplex.
4. The console port is an RS232 port and should not be used for cable distances greater than 20 metres.

Desktop Installation

1. Locate the switch in a clean, flat and safe position that has easy access to AC power. Ensure that there is sufficient clearance around the switch to enable air circulation.
2. Fit the self-adhesive rubber feet to the underside of the switch.

Installing The Switch Into A 19” Rack

1. Identify the required locations and ensure that there is at least 10cm clearance at the front and rear of the switch to allow cables to be accommodated.
2. Fit the supplied rackmount bracket on both side plates of the switch using a screwdriver.
3. Locate the switch into the rack and align the holes in the brackets with holes in the rack vertical strips. Secure the switch using the supplied bolts.

Installing The Optional Fiber Uplink Module

See instructions on web site and module manual for further details.

1. Remove the two screws securing the front panel blanking plate located in the right hand side of the panel.
2. Ensure that there is no power on the switch and then carefully fit the plug-in module and secure it using the thumbscrews.

Completing The Installation

When the switch has been installed as specified above, then the unit can be configured as detailed below:-

1. Apply AC power to the switch. The green Power LED on the front panel should light.
2. Connect the Cat. 5/5e twisted pair cables from the network partner devices to the RJ-45 ports on the front panel of the switch. In certain cases a cross-over RJ-45 cable may be needed. When a connection is obtained, the green LK/ACT LED associated with the port will light.
3. If the fiber uplink is not used, then connect the RJ-45 uplink port to the required device (router, server, etc). When a connection is obtained, the green LK/ACT LED associated with port 16 will light. Ensure that there is no connection to the standard RJ-45 port 16.
4. If the fiber uplink is used, then connect the fiber link to the partner device (media converter, fiber NIC card or fiber switch etc). Ensure that the fiber uplink is set in the correct duplex mode (default = Full Duplex) using the front panel switch on the module. Verify that the green Link LED on the fiber module is lit which indicates that the optical link is valid.
5. If advanced modes such as port trunking or port-based VLANs are needed, then use the console port to configure the switch. See the console port instructions on the web site for further details.
6. If there are legacy devices that do not support auto-negotiation connected to the RJ-45 ports, then it may be necessary to program the switch using the console port. See the console port instructions on the web site for further details.
7. Note that auto-negotiation can take up to 30 seconds to complete depending on the partner device.

LED Indicators

The diagnostic LED indicators located on the front panel of the switch provide real-time information about switch status. The following table describes the LED status and meaning.

	LED	Color	Function
	Power	Green	Power on
	Trunking	Green	The switch is trunking to another compatible switch.
UTP PORT	**100**	Green	The UTP port is operating at 100Mbit/s
		Off	The UTP port is operating at 10Mbit/s or no partner device is attached
	LK/ACT	Green	Ethernet link pulses are present
		Blinks	Port transmitting or receiving packets
		Off	No device is attached or faulty cable
	FD/COL	Orange	The port is in full-duplex mode
		Blinks	Collisions in half-duplex mode
		Off	The port is in half-duplex mode

Optional Fiber Plug-In Module

	LED	Color	Function
FIBER PORT	**TX**	Blinks	Fiber port is transmitting data
		Off	No data is being transmitted
	RX	Blinks	Fiber port is receiving data
		Off	No data is being receiving
	Link	Green	The port is connected to a valid 100Base-FX fiber partner unit
		Off	No fiber connection is detected
	FDX/COL	Orange	The port is in full-duplex mode
		Blinks	Collisions in half-duplex mode
		Off	No device attached or in half duplex

Table 1 - LED Status and description

See optional fiber module manual or the web site for details.

Trouble Shooting

Power

1. Verify that the AC power is present and that the external fusing is correct and compliant with national requirements. The green Power LED should be lit to indicate that the switch is powered correctly.

Data Problems

1. Ensure that the Ethernet partner device (switch, router, NIC etc) connected to the RJ-45 UTP port of the switch is set for auto-negotiation. If this Ethernet partner device does not support auto-negotiation, then you need to program that device to operate at 100Mbit/s half duplex or 10Mbit/s half duplex. If this is not possible, then the Tyco switch can be programmed from the front panel console port to apply the required speed and duplex modes to match the legacy partner equipment. See the web site for the console programming guide.

   If the switch and the partner device cannot auto-negotiate then the units automatically revert to the lower level of half-duplex operation. This issue is common to all auto-negotiating Ethernet devices and symptoms of incorrect negotiation include data errors and fragmented packets.

2. Auto-negotiation can take up to 30 seconds to complete depending on the partner device.

3. Ensure that the switch is not overheating due to obstructed airflow around the side vents.

Optional Fiber Uplink Module

1. Select the proper fiber cable for your network. The multi-mode module must use multi-mode fiber cable and the single-mode module must use single-mode fiber cable. See page 4 for the supported cable types and installation settings.

2. Ensure that the optical loss budget of the fiber uplink is within the limits specified on page 8. Note that optical patch cables and other joints and splices can introduce additional optical losses that reduce the working distance of the fiber link.

If you still have problems and need further advice, please see Technical Support section on page 2 to obtain more information.

Accessory Product Part Numbers

The following plug-in fiber modules are available as accessory products for this switch:-

Product	Part Number
Module with SC multimode connectors	0-1591050-0
Module with ST multimode connectors	0-1591052-0
Module with MT-RJ multimode connector	0-1591054-0
Module with SC singlemode connectors	0-1591056-0

Consult dealer for precise order codes.

Optional Fiber Uplink Port Specifications

The optional modules operate at the 1310nm optical wavelength for both the multimode and singlemode media converters.

The fiber size used for multimode links is 50/125 or 62/125 micron. The fiber size used for singlemode links is 8/125 or 9/125 micron.

The maximum distance between any two fiber optic devices is determined by a number of factors including optical link loss, the type and number of patch cords and joints in the link, the launch power of the transmitter and the sensitivity of the receiver. These variables make calculating the maximum working distance between two converters quite difficult and so it is best to design networks using optical loss budgets rather than using just working distance.

Plug-In Fiber Ethernet Module Type	Average Launch Power dB	Average Power Loss Budget dBm	Average Sensitivity dB
Multimode Converter (SC)	-18dB	12dBm	-30dB
Multimode Converter (ST)	-18dB	12dBm	-30dB
Multimode Converter (MT-RJ)	-16dB	14dBm	-30dB
Singlemode Converter (SC)	-18dB	12dBm	-30dB

Table 2 - Optical Specifications

Product Specification

Standards Compliance	IEEE 802.3 10Base-T Ethernet IEEE 802.3u 100 BASE-TX Fast Ethernet IEEE 802.3u 100 Base-FX Fast Ethernet ANSI/IEEE standard 802.3 N-way Auto-Negotiation
Max Forwarding Rate	14,880 pps Ethernet port (10Mbit/s) 148,800 pps Fast Ethernet port (100Mbit/s)
LED Indicators	Power, Trunking UTP Ports: Speed, Link Activity, Duplex / Collision
Ethernet LAN Copper Network Cable	10Base-T: 2-pair UTP/STP Cat. 3, 4, 5 cable EIA/TIA-586 100-ohm 100Base-TX: 2-pair UTP/STP Cat. 5 cable EIA/TIA-586 100-ohm
Optional Fiber Link Max. Distance	ST/SC/MT-RJ Multi-mode: Half-duplex: 412m, Full-duplex: 2Km SC Single-mode: Half-duplex: 412m, Full-duplex: 15Km.
Dimensions	440mm x 160mm x 44mm (W x D x H)
Weight	2Kg
Operating Temperature	0ºC to 45ºC (32ºF to 113ºF)
Operating Humidity	10% to 90% (Non-condensing)
Power Supply	Internal 100v to 240v AC, 50/60Hz auto-ranging, externally fused.
Power Consumption	16 Watts (Max.)
EMI	FCC Class A, CE Mark

Table 3 - Product Specifications